442688-01

Study Title

Glutamic Acid and GABA - Occurrence of Decarboxylation of Glutamate to GABA

Literature Citation: *Biological Chemistry*, H. R. Mahler and E. H. Cordes
Harper & Row Publishers, Copyright 1966, Page 685

Data Requirement

Not Applicable

Authors

H. R. Mahler and E. H. Cordes

Study Completed on

Not Applicable

Performing Laboratory

Not Applicable

Laboratory Project ID Number

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Statement of Data Confidentiality

No claim of confidentiality is made for any information contained in this study on the basis of its falling within the scope of FIFRA Section 10(d)(1)(A), (B) or (C).

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Good Laboratory Practices Statement

The submitter of this study was neither the sponsor of this study nor conducted it, and does not know whether it has been conducted in accordance with 40 CFR Part 160.

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The metabolic roles of transaminations are several and significant. Important functions include (1) amino acid biosynthesis (transamination is directly involved in the synthesis of at least eleven of the amino acids); (2) amino acid degradation (see discussion below); (3) liaison between carbohydrate and amino acid metabolism; and (4) synthesis of several specific compounds, including urea and γ-amino butyric acid.

The transaminases are ubiquitous enzymes. Individual enzymes may be fairly specific for a given substrate pair or, alternatively, may be able to catalyze reactions involving a broad spectrum of amino and keto acids. At

TABLE 16-5. Enzymic Decarboxylation of Amino Acids

Amino Acid	*Decarboxylation product*	*Occurrence*
L-Arginine	Agmatine	Microorganisms (e.g., *E. coli*)
L-Aspartic acid	β-Alanine	*Rhizobium leguminosarum*
L-Cysteic acid	Taurine	Liver, spleen, brain
L-Cysteine sulfinic acid	Hypotaurine	Liver, spleen, brain
L-Glutamic acid	γ-Aminobutyric acid	Microorganisms (e.g., *Cl. welchii, E. coli*), animal tissues (brain, liver, muscle), higher plants (barley, spinach, phlox)
γ-Hydroxy-L-glutamic acid	γ-Amino-α-hydroxybutyric acid	*E. coli*
γ-Methylene-L-glutamic acid	α-Methylene-γ-aminobutyric acid	Barley, red pepper, peanut
L-Histidine	Histamine	Microorganisms (e.g., *Cl. welchii, Lactobacilli*), animal tissues (kidney, liver, duodenum)
L-Lysine	Cadaverine	Microorganisms (e.g., *B. cadaveris, E. coli*)
meso-α, ε-Diaminopimelic acid	L-Lysine	Microorganisms (e.g., *E. coli, A. aerogenes*)
L-Ornithine	Putrescine	Microorganisms (e.g., *Cl. septicum*)
L-Phenylalanine	β-Phenylethylamine	Microorganisms (e.g., *Streptococcus fecalis*)
L-Tyrosine	Tyramine	Microorganisms (e.g., *S. fecalis*), animal tissues (e.g., kidney)
3,4-Dihydroxy-L-phenylalanine	3,4-Dihydroxy-β-phenylethylamine	Microorganisms (e.g., *S. fecalis*), animal tissues (e.g., kidney)
5-Hydroxy-L-tryptophan	5-Hydroxytryptamine	Animal tissues (e.g., kidney, brain, stomach)
L-Valine	Isobutylamine	*Proteus vulgaris*
L-Leucine	Isoamylamine	*Proteus vulgaris*
D-Lysine	Cadaverine	Microorganisms

SOURCE: J. Fruton and S. Simonds: "General Biochemistry," Wiley, p. 767, New York, 1958.